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Minister's Approval Statement for Carillon Provincial Park

Carillon Provincial Park, classified as a Recreation Park, is located on the eastern boundary of Ontario. The park serves the residents of southeastern Ontario and many visitors from western Quebec and northeastern United States.

In this regard, Carillon is the eastern gateway of the Ontario Provincial Park System. Through the experiences and information available at Carillon, it is my sincere hope that visitors will be encouraged to explore recreational opportunities at other provincial parks. The landscape of Carillon Provincial Park, in association with the Ottawa River, provides a setting for a wide variety of recreational activities and significant habitats for wildlife.

As approved by me, this Master Plan is the official policy for the preservation, development and management of Carillon Provincial Park.



Frank S. Miller
Minister of Natural Resources
October, 1977

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Metric Measures

Unit	Abbreviation	Imperial Equivalent
centimetre	cm	0.3937 inches
metre	m	3.2808 feet
kilometre	km	0.6214 miles
hectare	ha	2.4710 acres
degree centigrade	°C	(°C x 9/5) + 32 = degrees Fahrenheit (°F)

Introduction

Carillon Provincial Park is located in East Hawkesbury Township, Prescott County, within the Cornwall District of the Eastern Region (Figure 1). It presently consists of 694 ha, stretching 5.6 km along the south shore of the Ottawa River between the villages of Pointe-Fortune on the east and Chute-à-Blondeau on the west. It is bounded by the Ottawa River on the north and Highway 417 on the south. The Ontario-Quebec provincial border is only 1.6 km to the east of the park.

Although a dam had existed at Pointe-Fortune below the Long Sault Rapids prior to 1900, these extensive series of rapids were not completely obliterated until the Carillon Dam was constructed between 1960 and 1962. Flooding that followed the completion of the dam turned fields and woodlands into marshland. The patterns of previous land use and the alteration of both landform and shoreline are readily apparent at Carillon. The relatively flat terrain and mixture of open fields, bush and sheltered bays enable the park to accommodate high-intensity and extensive water-oriented and land-oriented recreational use.

The park is within an hour's drive from Montreal, Ottawa, and the United States border. Highway 417, bordering the park, and Highway 138 offer excellent access. With such densely populated urban centres in the vicinity and its location along a major tourist route, heavy demands are expected on day-use and camping facilities.

Carillon is accessible by boat using the Great Lakes and St. Lawrence waterways, and the Rideau and Trent-Severn Canal systems. The facilities and services required, such as dockage, fuel and supplies, are presently available a short distance away in Hawkesbury. However, several limitations to boating exist at Carillon, especially the constraints of shallow and severely fluctuating waters and the presence of submerged obstacles. Most boating use along the Carillon section of the Ottawa River is by small craft for day-use activities such as fishing and sightseeing. Increasing fuel costs are expected to further constrain boat-touring.

The park is very significant from a regional perspective because it is located on the eastern edge of the Eastern Region; present recreational development is limited in the north half of the Cornwall District. Although the St. Lawrence parks are located close to Carillon along the Highway 401 and Highway 2 travel corridor in the southern half of the Cornwall District, heavy demands for recreational and outdoor education facilities have already been experienced in the rather short existence of the park. For example, it received approximately 158,000 visitors in 1975. This trend is likely to continue as the St. Lawrence Parks Commission is operating its parks at maximum capacity and has limited potential for expanding its facilities.

Carillon provides an ideal and attractive setting for some of the large and diverse population concentrations in close proximity, and their existing needs for outdoor recreational facilities. The park can by no means cater to all their needs and interests. Therefore, in planning for the development and management of Carillon, serious consideration is given to balancing the demand for recreational opportunities and facilities against the supply capability of the physical resources.

Carillon Provincial Park has been developed through the co-operation of the federal government under The Agricultural Rehabilitation and Development Act, a cost-sharing program between the provincial and federal governments designed to assist rural development by means of farm adjustment, rehabilitation and rural resource development. Its goal is to improve the economic base and to provide employment opportunities for local residents.

Existing Situation

The land adjacent to Carillon is owned by private individuals to the east and west, by Quebec Hydro to the north and by the Ministry of Transportation and Communications and a private individual to the south (Figure 2). It would be advantageous to have ownership or control of some of these properties for park purposes. Acquisition would allow for program expansion and control and would reduce land-use conflicts and management problems. Shoreline control is a prime example of the need to relocate park boundaries. Quebec Hydro presently has control of the shoreline and waters up to approximately the 138 feet (42 m) contour level. This poses several problems regarding enforcement and management when considering such things as waterfowl hunting, boating and beach development. The properties in the southeastern section of the park which were transferred to the Ministry of Transportation and Communications for a service centre should be returned to the park if the M.T.C. decides not to proceed with that project.

Existing Development

The present level of recreational development shown in Figure 3 includes facilities for both day-use and extended use. There are 450 auto campsites available, 60 of which have electrical servicing. The camping areas have a total of 183 m of beach and two boat-launching ramps and are equipped with comfort stations and water supply systems. The existing day-use area has adequate parking for 350 vehicles. Other day-use facilities include comfort stations, a picnic shelter, a boat launch, and 305 m of man-made beach.

Table 1: Market Area Percent Population Distribution

Market Area	% of Total Market Area Population	% of Urban Centred Population
Ontario	14.0	11.5
Quebec	78.9	85.4
New York	4.1	1.7
Vermont	2.3	1.4

Table 2: Park Visitor Data

	1970	1971	1972	1973	1974	1975
Total	4,781	46,769	67,886	114,981	101,708	158,236
Day-use (permits issued)	440	13,384	13,788	35,000	34,075	45,038
Campers (from permits)	216	8,086	8,354	18,082	17,117	18,089
Camper-days	277	10,736	14,030	26,532	31,175	41,507
Camper-days per campsite	2	35	46	88	103	137
Average length of stay (days)	1.3	1.3	1.7	1.5	1.8	2.3
July-Aug. occupancy rate (%)	—	12	13	39	31	40

Table 3: Park Visitor Origins

	Camping	Ontario %	Quebec %	Other Prov. %	U.S.A. %
		Quebec %	Ontario %	U.S.A. & Other Prov. %	
1971		35.2	32.1	6.8	25.9
1972		31.2	40.6	7.6	20.6
1973		31.5	49.2	5.7	13.6
1974		31.3	53.9	2.2	12.6
1975		31.9	53.8	4.9	9.4
Day-use					
1975		80	20	0	

Figure 1

Regional and Local Setting

- Provincial Parks
- Park Reserves



Figure 2

Existing Land Ownership



Figure 3

Existing Park Development

- 1 Campground 1
- 2 Campground 2
- 3 Boat Launch
- 4 Firewood
- 5 Parking
- 6 Comfort Station
- 7 Dog Training Area
- 8 Administration
- 9 Control Office

Beach
Campgrounds

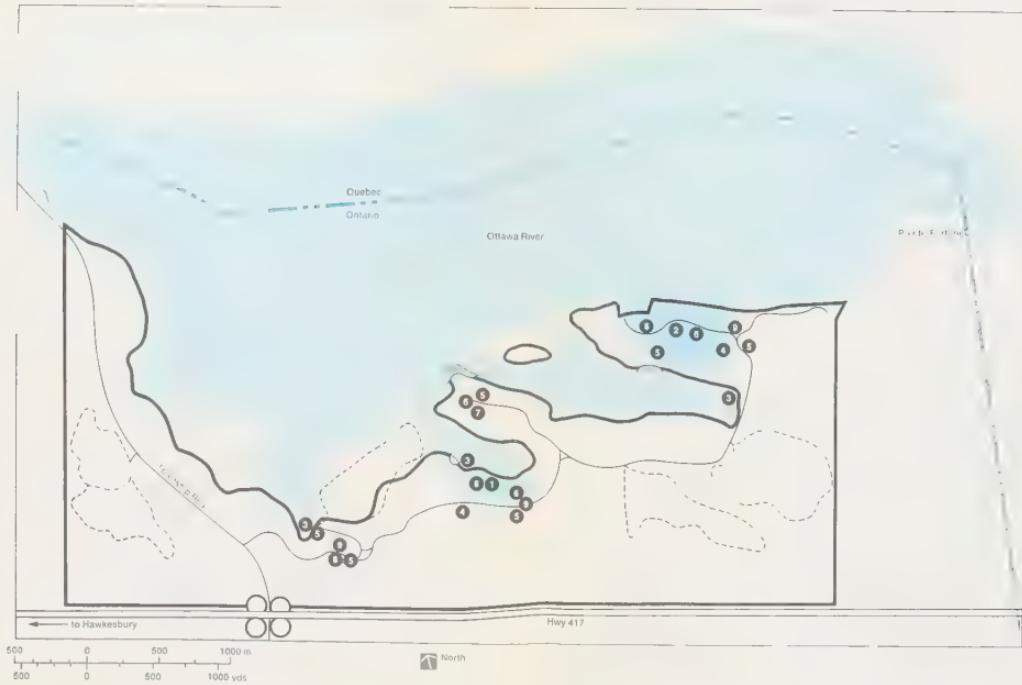


Figure 4

Market Area



Recreation Trends

Participation in outdoor recreation activities is continuing to increase both in numbers of people involved and the frequency of occurrence. This general upward trend is due to such factors as the growth in population and the increasing number of urban dwellers desiring a retreat from the city during their leisure time.

Most activities are experiencing upward trends in popularity with occasional mild downward fluctuations. Participation in camping, snowmobiling, powerboating, canoeing, bicycling and cross-country skiing is increasing considerably. Hunting seems to be experiencing a downward trend, however, perhaps due to the decrease in available hunting areas and a cultural shift in interest. With improved hunting conditions and with increasing food costs, the present trend will likely be reversed. Traditional activities such as swimming, hiking, recreational driving and sightseeing are still extremely popular and show increasing frequency of occurrence.

Recreation trends have been noted in several recent surveys. The data in Table 4 and Table 5 is cited from the Tourism Outdoor Recreation Planning Study, and the Canadian Outdoor Recreation Demand Study, respectively.

Table 4: Participation in Top 25 Recreational Activities At Least Once Over a 12-Month Period

Activity	% Participation
Recreational Driving	63.4
Swimming	62.1
Picnicking	56.8
Attending annually scheduled fair or other special event	51.7
Attending a spectator sport	50.4
Walking	49.1
Visiting recreation home	43.8
Fishing	38.3
Attending live theatre or concert	37.8
Visiting a museum or art gallery	33.3
Visiting botanical garden	33.2
Motorboating	32.8
Visiting a developed historic site or display	32.6
Ice-skating	29.3
Visiting other nature displays	28.9
Camping	28.3
Bicycling	27.8
Hiking	20.8
Snowmobiling	19.8
Tobogganing, Sledding	19.7
Baseball, Softball	18.0
Alley bowling	16.0
Canoeing	15.1
Viewing, Photographing	13.2
Golfing	13.1

Table 5: Percentage of Change in Participation in Outdoor Recreation between 1969 and 1972

Activity	Ontario %	Metro Toronto %	Quebec %	Metro Montreal %	Canada %
Tent-camping	90	112	38	36	58
Trailer-camping	150	200	60	17	67
Pick-up camper	100	100	0	100	100
Hunting	-20	-20	-17	0	-15
Powerboating	0	-4	78	-60	21
Canoeing	10	27	22	25	25
Sailing	50	43	100	0	33
Visiting historic parks/sites	-2	-13	0	-22	-3
Recreational driving	0	-14	-8	-14	-3
Sightseeing from private vehicle	-17	-28	-21	-18	-12
Downhill skiing	13	10	7	6	0
Snowmobiling	70	12	19	-7	28
Picnicking	0	4	-4	-9	0
Walking/Hiking	-2	-19	5	-13	5
Ice-skating	4	0	6	-9	5
Horseback riding	0	-38	12	0	0
Bicycling	54	18	36	27	46
Cross-country skiing	20	15	5	11	12

The preliminary results of the Ontario Household Recreation Survey (1975) indicated that the three activities most frequently participated in were recreational driving (63.4%), swimming (62.1%) and picnicking (56.8%). All selected activities showed higher participation rates for males than females. Young males and people with higher income and education levels participated in a much greater total number of activities.

The importance of available opportunity was shown by a higher than average participation in snowmobiling and fishing in Northern Ontario and a lower than average participation in tennis for non-large urban areas. Participation in hiking increased rapidly with increasing education, but less rapidly with increasing income. Also, participation in sailing and downhill skiing increased with higher income and education levels.

In 1974, a continuing program was set up to survey on a regular basis the users of provincial parks. The pilot program was concerned with day-users in eleven provincial parks, one of which was Carillon. Tables 6, 7, 8, 9 and 10 summarize the information for Carillon as compared to the average for all eleven parks in the study.

Table 6: Day-Visitor Group Type

	Carillon %	All Parks Surveyed %
Family Group	49.8	57.8
One Couple	19.9	18.5
Organized Group	6.8	2.3
Group of Friends	19.9	19.3
Single Person	2.7	1.7
Other	0.9	0.4

Table 7: Day-Visitor Age Groups

Ages	Carillon %	All Parks Surveyed %
1 - 14	34.3	31.8
15 - 24	15.8	22.5
25 - 44	38.6	31.7
45 - 64	8.6	11.2
65 and over	2.7	2.9

Table 8: Day-Visitors Who Had Previously Visited the Park

	Carillon %	All Parks Surveyed %
Yes	48.1	65.6
No	51.9	34.4

Table 9: Nature of Trip from Home by Day-Visitor Party

	Carillon %	All Parks Surveyed %
Day trip	80.7	64.4
Extended trip (overnight stay)	14.3	35.6

Table 10: Day-Visitor Participation in Activities

(Percentage of total day-visitors who participated in each activity)

Activity	Carillon %	1972 CORDS %
Picnicking	74	56
Swimming/Wading	70	53
Relaxing	62	49
Casual play	47	—
Trail hiking	13	38
Viewing/Photographing	13	21
Visiting viewpoints	11	(42)
Fishing	10	30
Using playgrounds	7	—
Viewing natural historic displays	4	—
Conducted walks	3	—
Canoeing	3	11
Motorboating	2	—
Bicycling	2	20
Slide show talks	1	—

Some interesting conclusions for day-users at Carillon Provincial Park can be drawn from the analysis of these tables:

1. There are more organized groups taking day-use outings in the park, and not as many family groups.
2. There are fewer day-users in the 15-24 years age group than in the young adults (25-44 years) age group.
3. As might be anticipated with a fairly new park, there are fewer day-users who have been to the park previously.
4. A greater than average percentage use Carillon for day-visits from their homes. Fewer day-use visits are made by people on an extended trip.
5. The activity participation reflects the recreational program at the park. For comparison purposes, the participation survey results from the 1972 Canadian Outdoor Recreation Demand Study are given where the activity is comparable.

Biophysical Resources

Climate

The area has a relatively moderate climate in terms of temperature range and precipitation. The climatic conditions can support a variety of outdoor recreation activities over the entire year. Snow cover is usually sufficient for snowshoeing, cross-country skiing and snowmobiling for four months of the year. Although ice conditions on the Ottawa River are generally not safe, local residents use the ice-covered river for travel and ice fishing for three months starting in late December. Severe fluctuations in the water level resulting from the operation of the Carillon Dam add to the unsafe conditions. Use of the river for winter recreational activities will not be part of the park program; visitors wishing to use the river will do so at their own risk. The Ministry will not encourage winter use of the river and will inform park visitors about unsafe ice conditions on the Ottawa River.

The prevailing winds are westerly with an average velocity of 13 km per hour. Winds bringing rain and snow usually blow from the northeast or the south. Generally, the wind conditions in the area have little effect on the park except along the open shoreline to the eastern half of the park. These areas are affected by winds from the northeast.

Table 11: General Climatic Conditions

	Average Temperature (°C)	Average Precipitation (cm)	Average Snowfall (cm)
January	-7	8.4	45.0
February	-7	6.4	39.6
March	-2	6.5	24.9
April	6	5.6	7.1
May	12	6.1	—
June	18	6.9	—
July	21	6.4	—
August	20	6.5	—
September	16	7.1	Trace
October	8	5.8	0.5
November	2	7.1	10.2
December	-6	6.4	30.0
Annual	7	79.2	175.7

Geology and Geomorphology

Carillon Provincial Park is located in the physiographic site region defined by Hills as 6-E Humid Eastern Ontario, and more specifically within two smaller regions, or physiographic districts, known as the Prescott and Russell Sand Plains and the Ottawa Valley Clay Plains (Hills, 1959).

The area was previously covered with water; but as the land rose up, the sea drained away. Large domes were pushed up in the Adirondacks, in the Algonquin area and in Wisconsin, while basins such as the Ottawa Valley appeared between these domes.

Around 750,000 years ago, the four great Pleistocene glaciers moved down. About 1,830 m thick and covering half the continent, they passed through Southern Ontario on four occasions, the last being 8,000 years ago. The weight of these gargantuan ice masses caused the Ottawa, St. Lawrence and Great Lakes lowlands to sink.

When the last glacier had receded, the sea rushed in again, forming the Champlain Sea which was 152 m deep where Carillon now stands. The earth rebounded, and again the sea drained off, leaving behind beaches, sandy deposits and old glacial deposits. The bones of whales have been found in this material.

The Ottawa was a large and very important river at this time, as the glaciers had altered drainage patterns. Sandy deltas appeared between its many channels. The park had elevated sandy areas and mucky clay beds. The soils were deposited over the limestone base in deep layers. Thus, there are no visible rock outcroppings in the park today.

There are few major terrain differences in the park area, as shown in Figure 5. Basically, the land is flat, broken only by a few rolling hills and the occasional small gully or ravine such as the eroded creek beds. A major contrast, however, exists between the Canadian Shield, north of the Ottawa River in Quebec, and the lowlands south of the river where the park is located. Some contrast can be seen on the south shore as well. East of the park the shoreline is indented with bays and inlets, while to the west it is more uniform in nature.

The south side of the park is level and about 12 m higher than the Ottawa River shore. A well-defined slope separates the park into two sections in the north-south plane. Throughout most of the central and eastern portions of the park, the change in elevation is fairly uniform and gradual, producing small rolling hills and low meadows. In the western section, the changes in elevation remain very gradual approaching the south-west corner. At this point, the topography becomes rugged as the landscape rises abruptly in a series of small, steep hills.

Soil

The soil deposits found throughout the park are deep, and they overlie limestone bedrock of Ordovician age, about 450 million years old. These soils have a wide range of texture and origin, and can be grouped as sands, loams, clays and muck, as shown in Figure 6.

The sand deposits are rather extensive and are either deltaic or have originated as outwash. These types of deposits are often associated with areas of high water tables. The sandy areas in the park are characterized by a relatively rough topography in comparison with the surrounding landscape. The effect of duning in these sandy areas will explain this condition. Adjoining these sandy areas are flat plains of finer sands and silt which are alternately banded and of considerable depth.

Various types of glacial tills or loam, which are non-sorted materials made up of broken rock fragments ranging in size from clay to boulders, can also be found in the area. These deposits occur principally as isolated hills or small elevations and are surrounded by sand and clay flats. The loam deposits are chiefly of local origin and are usually calcareous since they are derived from limestone. Most of the stones and boulders are derived from the underlying limestone bedrock.

Clay is the primary soil type underlying all of the surface deposits. Clay flats are also evident at various locations in the park. Areas of muck can also be found and are associated with the more poorly-drained areas.

Drainage

Drainage conditions in the park area are severely affected by the prevalence of imperfectly drained soils such as muck and clay, the rather flat relief and the high water table which occurs throughout most of the park between the 41 m and 49 m elevation. The central sections of the park are quite damp or wet throughout most of the year and provide ideal breeding conditions for insects. Marsh, swamp and wetland vegetation characterize the extensive areas of poor drainage. A detailed analysis of the drainage conditions in the park is shown in Figure 7.

Vegetation and Wildlife

Carillon is broken into many sections by the indented shoreline of the Ottawa River and by the almost checkerboard pattern of open fields and woodlands. These conditions give the park a definite character which has resulted essentially from the influence of man upon the environment. Logging, cultivation and flooding have altered not only the physical condition of the area, but also the ecosystems.

As indicated in Figure 8, a variety of deciduous and coniferous forest compositions, in terms of both species and density, can be found throughout the park particularly in the central and eastern section. Sugar maple, red maple, black maple, white elm, black and white ash, white, yellow and grey birch, basswood, black alder, willows, white spruce, balsam fir, eastern hemlock, white pine, white cedar, eastern larch and hawthorne can be found at Carillon.

Since the park area has had a long history of settlement, the forest vegetation is generally sparse and confined to woodlots or to uncultivated areas. In their virgin condition, most of the poorly-drained flats were covered with stands of elm, red maple, black and white ash, yellow birch, white birch, black alder, basswood and willows. The better-drained soils had majestic stands of white pine, the principle product of the logging era. The more fertile soils were frequently associated with stands of ash, elm and maple; and it was these areas which were cleared and cultivated during the early settlement of the country.

Various interesting forest stands are located in the park. In the areas of hills and gullies in the southwest corner, there is a predominantly hardwood forest of sugar maple, beech and yellow birch merging into a conglomeration of tree species including hemlock and white pine. In the central section, a small sugar maple bush can be found as well as a representative lowland forest of mixed species. To the eastern end of the park is a fairly large cedar swamp which has been used as a deer yarding area. A point jutting out into the Ottawa River along the northeast shore is perhaps one of the most interesting areas of vegetation in the park. Hawthorne, wild fruit trees, shrubs and a variety of plants common to this region provide an excellent habitat attracting bobolinks, eastern meadowlarks and mourning doves which add brilliant colours and sounds to the area.

The old, open fields, meadows and marshes possess a variety of plant communities. Although no exotic or unusual plants are present, these areas are noteworthy for the excellent cover and source of food which they provide for upland game birds, rabbits, waterfowl and song birds. The locations of special features within the park are shown in Figure 9.

Stop

Flat < 1%

Gentle 1-5%

Moderate 5-10%

Steep > 10%

Proposed Park Boundary



Figure 6

Soil

- Sand
- Loam
- Clay
- Muck
- Eroded Creek Bed
- Proposed Park Boundary



Figure 7

Drainage

- Excellent
- Good
- Fair
- Poor
- Very Poor

■ Proposed Park Boundary

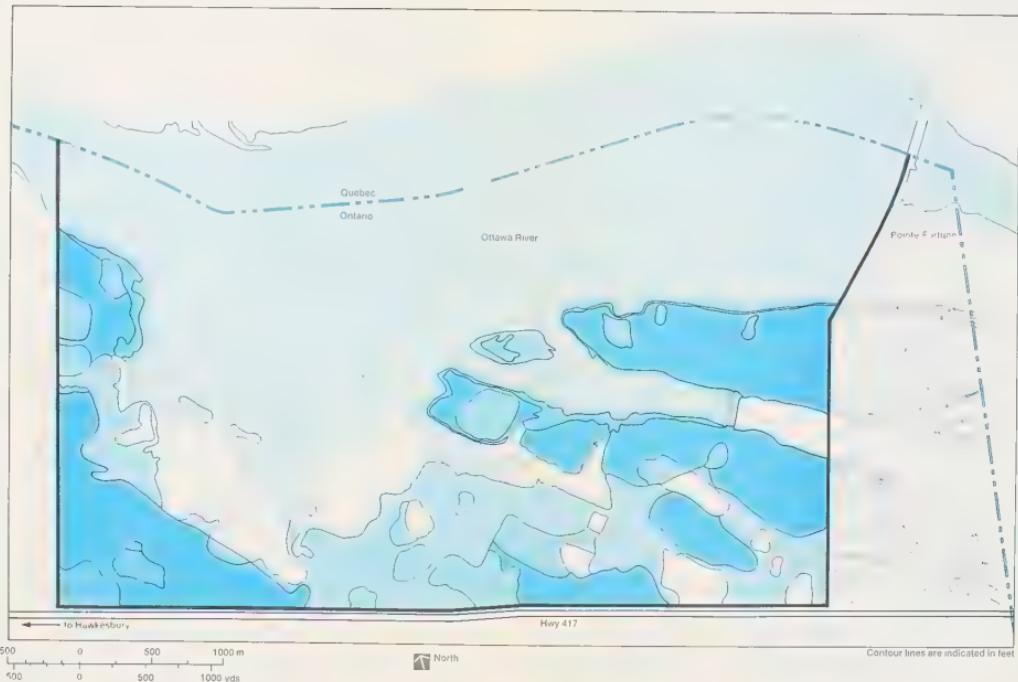


Figure 6

Vegetation

- [Light Blue Box] Deciduous Forest
- [Teal Box] Coniferous Forest
- [Dark Teal Box] Mixed Forest
- [White Box] Meadow
- [Light Gray Box] Cattail Marsh
- [Dark Gray Box] Hawthorn Savannah
- [White Box] Open Field
- [Black Line] Proposed Park Boundary

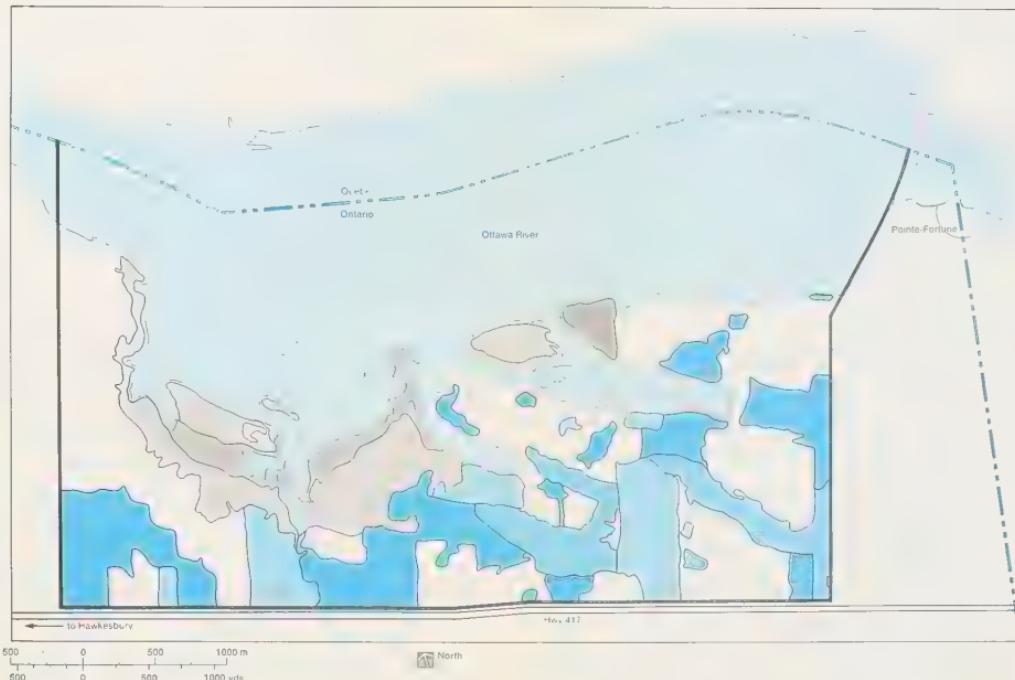
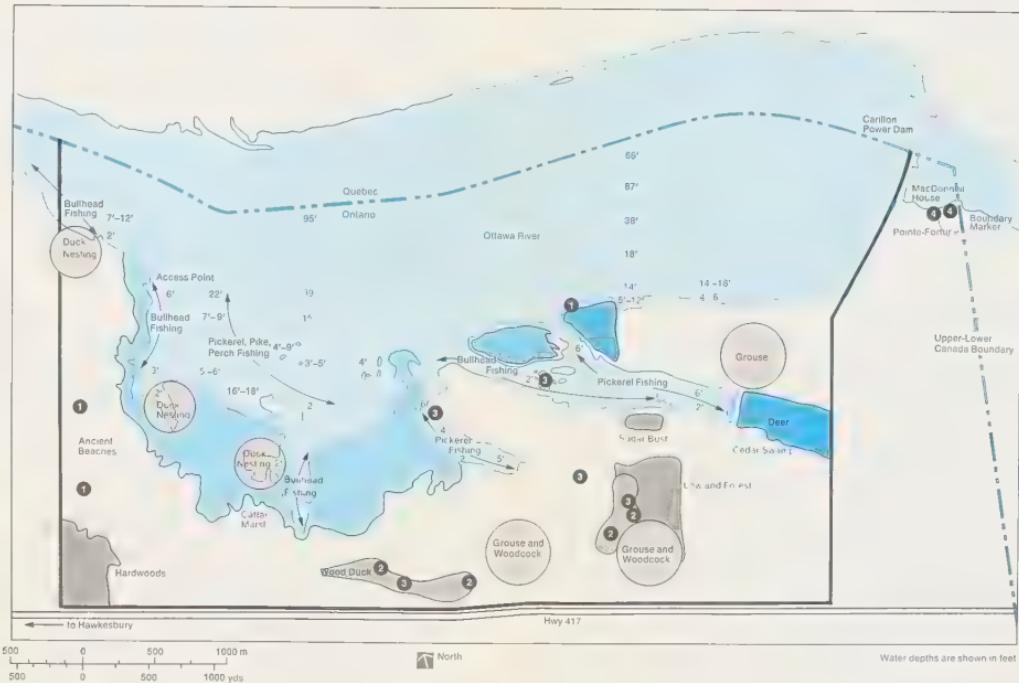


Figure 9

Special Natural Features

Legend:

- 1 Scenic View
- 2 Active Beaver House
- 3 Abandoned Beaver House
- 4 Historic Sites
- Wildlife Habitat
- Beaver Pond
- Forest Cover
- Marsh
- Meadow
- Hawthorn Savannah
- Swamp
- Proposed Park Boundary



Cultural Resources

Within the confines of the park, there appears to be no evidence of any early historic sites or remains. However, the park's situation on the Ottawa River places it in an area that has had an important part to play in the exploration and development of Canada. The Indians, the fur traders, the loggers, the lumbermen and the settlers all in turn relied on the Ottawa as a transportation route. All were confronted with a long and treacherous series of rapids, the Long Sault Rapids, which once occupied that section of the Ottawa River adjacent to Carillon Provincial Park. What used to be a picturesque section of the Grand River of the Algonquin is now submerged by the impounded waters of the Quebec Hydro Dam that links Pointe-Fortune, Ontario and Carillon, Quebec.

The Indians were the first to realize the value of the Ottawa as a travel route both in their nomadic wanderings and their tribal wars. The Long Sault Rapids presented a brutal obstruction to their delicate craft. In 1613, Samuel de Champlain, the famous geographer, explorer and colonizer of Canada nearly lost his life in these dangerous waters. Countless adventurers who followed Champlain experienced great difficulty and often disaster in the Long Sault passage.

Throughout the seventeenth and eighteenth centuries, the Ottawa River was the major canoe route used by Canada's most important early enterprise, the fur trade. The Long Sault portages afforded natural stopping-off places and fur trading posts developed there. Carillon, the name of the section of the historic rapids closest to the park, is said to have been derived from a fur trader, Philippe Carrion du Fresnay, who established a post in this region in 1681.

In 1660, somewhere in the region of the Long Sault, the famous Adam Dollard Daulac des Ormeaux and his companions perished in an encounter with the Iroquois, the deadly enemy of the French throughout the period. The importance of this battle in dissuading the Iroquois from a massive attack on French settlements farther down the St. Lawrence is still under debate. But doubtless, this much-celebrated incident demonstrated how crucial the control of the Ottawa route was to the fur trade and the prosperity of New France.

After the war of 1812, there was great fear that Kingston, an important shipbuilding and military settlement, would be cut off from the rest of Canada. If the United States controlled the St. Lawrence along the southern border of Upper Canada, this important outpost on the Great Lakes would be lost, cut off from its source of supply. Between 1826 and 1833, a series of canals was built to connect Quebec and Kingston by a secondary route using the Ottawa and Rideau rivers. Three canals were constructed in the Long Sault section of the Ottawa River. The canal at the Carillon rapids was located directly across the river from the park. In 1881, a dam was constructed to increase the depth of the Carillon Canal, destroying the original form of this section of the Long Sault.

During the nineteenth century, life in the Ottawa Valley revolved around the lumber industry. Long Sault was a serious hindrance to the transportation of lumber down the Ottawa, especially for floating rafts of squared timber to the Port of Quebec. Timber slides were constructed along the Long Sault to avoid obstructions. At Carillon, a slide was located at the centre of the old dam. Remnants of the timber era are still visible throughout the area, and some of the more notable can be found in Pointe-Fortune.

As indicated in Figure 9, the old Upper-Lower Canada boundary divides the village and a stone marker is still present. A hundred yards from this historic boundary, now the Ontario-Quebec boundary, lies Poplar Villa, constructed in 1817 by John MacDonnell, a prominent figure of the fur trading and logging era. Other interesting historical features in the village include the Plaque of Two Churches.

The construction of the hydroelectric dam at Carillon in the early sixties obliterated the Long Sault Rapids and submerged vestiges of its colourful past. Through a lease agreement with Ontario Hydro, Quebec Hydro constructed the Carillon Dam to produce hydroelectric power for Montreal and the surrounding area and to control flooding. In the agreement, Quebec Hydro was given control of all land below the 138 feet contour.

Park Policy

The impoundment of the Ottawa River created extensive marshland where farmers once tilled the soil. The harnessing of a once formidable obstacle for man's benefit has initiated a new and prosperous era for the historic Long Sault and has, as well, provided habitat for a wide variety of waterfowl and other wildlife.

In 1964, the Eastern Ontario Development Association, Waterway Committee, submitted a recommendation that a provincial park be established along the Ottawa River between the City of Ottawa and the Quebec boundary. The Department of Lands and Forests surveyed this section of shoreline and eventually identified lots within Concession I of East Hawkesbury Township as a suitable location for a park. The area had experienced recreational use by local residents for upland game hunting, fishing and, with the flooding after the construction of the Carillon Dam, for waterfowl hunting.

In July 1966, the Ontario Parks Integration Board accepted the proposal of the Department of Lands and Forests and gave approval for the Department of Public Works to negotiate acquisition in the area. By October 1966, the Department of Public Works was actively engaged in acquiring lands from Ontario Hydro and private owners to establish what is now Carillon Provincial Park. The present park development program was initiated in 1967.

Park Goal

The park goal is to provide, within the capabilities of the physical resources, year-round recreational and educational activities for the people of Ontario and for visitors to the province. It focuses on the needs and interest of a large urban population. To realize this goal, the recreational objectives, in broad terms, are to provide for intensive recreation activities, including day-use and extended use.

Day-use facilities and services will be emphasized on a year-round basis, and will include such traditional activities as bathing, picnicking, fishing, boating and waterfowl hunting. Campsite development will accommodate a wide range of camping needs from overnight to weekend and vacation use. It will accommodate auto camping, trailers and other recreational vehicles and will include electrical sites.

Carillon, being the first Ontario provincial park encountered when travelling from the east and one of the few public properties in the area, has great value as an educational resource. The park and its program give visitors their first glimpse of the Ontario Provincial Parks System and the Ministry. The impression and the orientation material received at Carillon will strongly influence opinion about the Provincial Parks System, the Ministry and the province. Carillon can also serve as an outdoor educational resource for Prescott and Russell counties in association with the Larose County Forest. The study of natural and cultural history and the observation of resources management techniques are examples of the educational benefits of the park.

Park Classification

The resources and location allow Carillon Provincial Park to be primarily user-oriented. Consequently, it will be classified as a "recreation park" and will be developed and managed for intensive year-round recreational use in accordance with the guidelines set down in the administrative policies of the Ontario Provincial Parks System.

Outdoor Recreation Management

To accommodate high-intensity use and activities within the limited resources, intensive recreational development and management programs will be set up.

Boating activity will be controlled by restricting its use near swimming areas and by locating launching and docking facilities where they will not conflict with other park uses. Snowmobiles will be permitted only in designated areas of the park's land base. Firearms will be permitted in the park for the purpose of waterfowl hunting in designated areas and at designated times during the regular migratory bird hunting season. Field and retrieval trials will be permitted in all of the park zones through reservation and written permission.

The visitor services program will include information, outdoor education and interpretive and recreational skills. Also, cultural and historical interpretation, resource management demonstration areas, information and orientation to the park as well as outdoor recreation skills development may be considered within the program.

The northern boundary of the park will be extended to coincide with the Ontario-Quebec border. At present, the Ministry of Natural Resources has jurisdiction over the property fronting on the Ottawa River down to 42 m above sea level. Since the normal water level is 41 m above sea level, the land between 42 m and 41 m is not under Ministry control. The Ottawa River and this land between 42 m and 41 m is under the jurisdiction of Quebec Hydro. They presently have a 99-year lease covering this area.

In order that park objectives can be met, boundary adjustment is necessary. The Ministry can then have surface control over the waters and shorelines fronting the park. At present, the Ministry has no legal control over people swimming in front of beaches located within the park boundary. The adjustment will facilitate the control of various activities such as the hunting of waterfowl from the shoreline and off-shore blinds. This control is extremely important to the success of any wildlife management program in the marsh area. The boundary adjustment is essential to the proper functioning of the park program. Without it, management problems will arise and the park visitor as well as the park will suffer. The park boundary will be marked by fencing, buoys and signs.

The park will be designed and developed to facilitate a pre-registration and pre-selection system of camping ground operation which will be implemented when required. In order to adequately serve the large numbers of French-speaking visitors to Carillon, park signs and information will utilize symbols where possible.

Carrying Capacity

Although there is considerable scientific literature on carrying capacity related to park and recreation development, there is yet no conclusive and reliable method of determining the carrying capacity of a specific natural area because of the numerous factors involved. This can only be determined after staged development has been incorporated and the effects of the use of the area on the landscape monitored. Within this context, the existing and proposed capacity of the park is outlined in Table 12.

Table 12: Existing and Proposed Park Capacity

Facility	Existing	Proposed
Campsites		
Regular	242	237
Hydro	60	263
Total Campsites	302	500
Visitor Capacity*	1,208	2,000
Parking		
Day-use	350	1,104
Camp Ground	75	108
Interpretive Centre	—	50
Trail Access	—	30
Boat Launch	10	30
Total Parking Spaces	485	1,212
Visitor Capacity*	1,940	4,848
Group Camping		
Total Group Camping Areas	2	4
Visitor Capacity	150	300
Total	3,298	7,148

*Based on 4 people per campsite and 4 people per car.

Visitor Services

Carillon has the potential of providing visitors recreational and educational opportunities. The park's potential value as an intensive recreation area will be recognized as its primary and most important function. Water-related recreational activities such as swimming, boating and fishing will doubtless be the most attractive features of the park. Camping, picnicking, waterfowl hunting, bicycling, sports and games, cross-country skiing, snowmobiling, snowshoeing and sightseeing will also give the park visitors enjoyable outdoor experiences.

The visitor services program will be designed to provide a range of outdoor education opportunities from activity-related to resource-related, and shall be designed as Programming for Experience. Outdoor education is considered ancillary to the recreation program, and will complement the overall program of the park. One dimension of this program will be the teaching and development of outdoor activity skills. Programmed activities such as competitive sports and games (e.g., baseball, horseshoes) and special seasonal activities (e.g., burbot fishing, maple syrup-making, and retrieval trials in the spring; duck hunting, dressing, cooking and gun safety in the fall; fishing derbies year-round; waterfowl migration in the spring and fall) could be part of this program.

Yet another dimension of a more traditional nature will be an interpretive program. Learning about various ecosystems (e.g., marsh, meadow, woodland and water), various natural phenomena (e.g., wildlife behaviour, land formation, timber succession) and about man's relationship with the land over time will make the visitor experience more meaningful. Also, the potential to use Carillon as an area to study natural and cultural history, especially for residents of the Cornwall District, will give the park added significance as a public resource. Carillon could be used to enhance educational programs carried on in the communities located within easy reach of the park and could be an area to demonstrate Ministry programs and resource management techniques.

Park Interpretive Theme

Although the primary motive of most visitors to come to Carillon is to retreat to open, natural spaces and enjoy recreational activities, the park also has potential to provide educational and interpretive experiences. There are several stories, old and new, which can be told at Carillon about the Ottawa River and its historical significance to the exploration and development of Canada, the early settlements and agricultural methods, the hydro and highway developments fringing the park. Change is the most dramatic visual aspect of the area. It is evident not only in the cultural history of the area, but also in the natural history, the formation of the landscape, the succession of the forest cover and the continuous activity of the natural environment.

Change in the landscape brought about by man and nature should be the basis for the interpretive program in Carillon Provincial Park. The most striking features are the patchwork of open fields (the residue of previous farming) and the marshlands caused by flooding after the construction of the hydroelectric dam at Carillon. These two major changes in the park area can be used as vehicles to present the larger story of change in Eastern Ontario.

Changes in forest types and topography due to the differences between the Ottawa-St. Lawrence Lowlands and the Canadian Shield are dramatically evident at Carillon Provincial Park. The Laurentian Plateau directly across the river is in striking contrast to the park area on the south side of the Ottawa. The rough, mountainous Canadian Shield stands out against the relatively flat lowlands on the south side of the river. The abundance of open land to the south made the lowlands a more attractive place for pioneer settlement in Upper Canada.

The formation of the sedimentary rocks underlying the Lowlands, the effects of glaciation and the Champlain Sea on soil types and drainage as well as the presence of wave-cut terraces formed when the Ottawa River was at a higher level can all be related to changes which man has made on the land, such as canal and dam building, logging and farming.

Resource Management

The extraction of resources may occur according to guidelines set down in management plans (e.g., beaver, carp). The primary motive for extraction will be for the purpose of enhancing or maintaining park values or achieving resource management objectives rather than for economic benefits.

Forest Management

Reforestation for landscaping and buffer development and silvicultural treatment of existing stands will be carried out to maintain existing stands and to provide a quality maple sugar bush. The Division of Forests will be consulted and its assistance requested in carrying out management of forest resources in the park.

Normal methods of fire detection and suppression will be permitted to protect the park resources. Measures for insect and disease control will be permitted when and where required to protect the vegetation and park users.

Fish and Wildlife

Enforcement, regulation and management including habitat improvement such as the planting of lure crops, hedge rows and cover vegetation and, when required, the control of species detrimental to the environment and park programs will be carried out throughout the park.

Trapping will be allowed only under Ministry guidelines and supervision as a part of the management programs (e.g., for beaver). Regulated hunting of waterfowl in designated areas at designated times will be permitted in conjunction with a wetland management program. Waterfowl viewing will be a consideration in the wetland management program.

Land and Water

No land disposition of park property will be allowed, including lands for rights-of-way of utility lines such as hydro and petroleum. Future electrical transmission lines and pipelines, including those required for utility servicing, will be placed underground. The park boundaries will be extended through agreement or land acquisition for program expansion and management controls. No private construction of structures, including waterfowl hunting blinds, will be permitted on park property.

The quality of swimming areas will be regularly monitored to ensure the safety of park users. Drinking water will be treated and regularly tested in accordance with public health regulations.

Land Acquisition

Carillon Provincial Park presently consists of 694 ha. In order to achieve the park goal and objectives and to alleviate potential management problems and land-use conflicts, it is recommended that the park area be enlarged to approximately 1,660 ha.

As discussed earlier, this will involve the extension of the park boundary to the Ontario-Quebec border, between Lot 3 and the eastern half of Lot 16. Negotiation and agreement with Ontario and Quebec Hydro will be necessary to obtain surface rights for this water limit.

Properties adjoining the existing park areas will have to be transferred from other government agencies or purchased from private individuals to enlarge the park as recommended. The following acquisitions will be required in Broken Front and in Concession I, Township of East Hawkesbury:

<i>Owner</i>	<i>Property</i>
Ministry of Transportation and Communications	Park Lot 6, 7, 8 Part E-½ Lot 5 Part Lot 4 Part Southeast Corner Lot 3
Private Land	Part W-½ Lot 5 Part NE-¼ Lot 3

Research

Research activities within the park that further the park goal and objectives may be carried out within the Ministry program or by written permission from the Ministry.

Park Zoning

In order to ensure orderly development and effective management, the park will be divided into four zones, as indicated in Figure 10. By means of zoning, optimum use relative to the park classification and the degree of development, use and protection can be planned. This will permit reasonable flexibility in management while ensuring the necessary protection of various areas from incompatible use. The park is divided into one development zone, and three natural environment zones. The total park area is approximately 1,660 ha.

Development Zone

This zone will consist of approximately 708 ha, including land and water areas. The zone is bounded by the Ontario-Quebec boundary to the north, the park boundary (i.e., lot line between Lots 2 and 3, Concession I) to the east, the main park road to the south and the half-lot line of Lot 10 to the west. The zone includes the main park road and administrative area. Most of it consists of old cultivated fields with scattered woodlots and clumps of bushes of various species. The purpose of the development zone is to provide an area for high intensity day-use and extended use (camping) recreation. Day-use and extended use facilities will be located within this zone and public access will be provided.

Three areas in the park will have the most concentrated development: the day-use, extended use and visitor service areas. A comprehensive analysis to provide a detailed site capability with recommendations for facility development will be carried out as part of the implementation of the master plan. The basic framework and relationships for access, parking areas, buildings, trails and recreational areas are outlined in Figure 11.

Day-Use Area

The day-use area will consist of two parts which will include parking lots, beach, picnic area and shelters, comfort station, change houses, play areas and equipment and mooring area.

Camping Area

Three campgrounds will be developed in the park and located in the development zone. The campgrounds will contain campsites (with tables, fire-grates, parking spaces, electrical hookups), beaches, boat launch and docking facilities, visitor parking, amphitheatre, portable fish-cleaning stations for spring use, comfort stations and laundry facilities. A group camping area will contain separate camping areas, an open activity area and vault privies.

Visitor Services Area

This area will include service facilities such as showers, laundry, a concession as well as an information/interpretive centre designed to fit the landscape and theme of the park. An amphitheatre and a maple sugar demonstration area will be developed and operated within this area.

Administration Area

The park office, maintenance and storage buildings will be located in this area.

Access Roads

The main two-way park road will run from the Carillon Park County Road to the various activity areas. One-way roads will be developed in the campgrounds for traffic control.

Outdoor Recreation Management

The recreational activities allowed in the development zone are: swimming, boating, fishing, picnicking, auto camping, bicycling, creative playgrounds, sports areas, hiking, group camping, interpretation and outdoor education, cross-country skiing, snowshoeing, snowmobiling and ice-skating.

The zone will be developed according to the following standards:

Campground development	10 sites/ha Maximum 540 auto campsites 110 visitor parking spaces maximum
Group camping area	4 sites maximum 50 people/site maximum 200 people maximum
Day-use area	1,125 parking spaces maximum 4,500 people maximum

Resource and Land Management

Resource and land management to retain environmental quality will be carried out as outlined in the general park policy.

Natural Environment Zone 1

This zone consists of approximately 485 ha including land and water areas. The zone lies immediately west of the development zone and is bordered to the west by the Carillon Park County Road, to the south by the main park road and to the north by the Ontario-Quebec boundary midway in the Ottawa River. The land portion of the zone is primarily marsh which merges with open meadows. Further inland, the zone consists of open fields.

This area has been specifically designated for wildlife management, particularly waterfowl. Development will be limited to trails, interpretive facilities and the management of the wildlife resource. In conjunction with this interpretive and regulated hunting activities will be major aspects of the zone. This zone will also enable water access and will serve as a buffer between other park zones and the Carillon Park County Road.

The facilities and services in this zone will be associated with the wildlife management program. Nesting, feeding and resting ponds will be established and maintained for viewing and hunting purposes. A parking area, boat launch, fish cleaning station, vault privies, trails and blinds will be provided.

Outdoor Recreation Management

Recreation activities permitted in this zone will include boating, waterfowl viewing, controlled waterfowl hunting, fishing, interpretation and outdoor education, cross-country skiing and snowshoeing.

The major controls for this zone will be in terms of wildlife management and will include: habitat development and maintenance; establishment of blinds within the capability of the area (approximately 20) and a parking area for a maximum of 30 vehicles.

Resource and Land Management

Resource and land management will follow the guidelines set out in the general park policy.

Natural Environment Zone 2

This second natural environment zone, consisting of approximately 324 ha, lies between the main park road and the park boundary parallel to Highway 417. The zone extends east from the Carillon Park County Road to the eastern park boundary between Lots 2 and 3, Concession I. A portion of the zone in the eastern half contains hills and gullies which contrast markedly with the low wetland in the western section. Generally speaking, the zone can be described as a checkerboard pattern of open fields and wooded areas of various cover densities and tree types.

The major purpose of this zone is to provide a visual and auditory buffer between other park zones and Highway 417. The wetland and wooded character of the zone also afford good potential for interpretation and outdoor education, wildlife management (e.g., wood-duck and beaver), and some limited extensive recreation activities such as walking, rambling, snowshoeing and cross-country skiing.

Since this area is essentially a buffer zone, very few facilities will be developed. The zone will be regarded as open park space and will not be programmed for specific activities. Rambling and exploring on foot, snowshoes or cross-country skis will provide park visitors with extensive recreational experiences. A limited trail system will be allowed in this zone in order to enhance an interpretive and outdoor education program. Snowmobiling will be permitted in designated areas. Recreation management controls will follow the guidelines set down in the general park policy.

Natural Environment Zone 3

This zone incorporates 142 ha of open field and woodland in the west section of the park lying between the Carillon Park County Road and the western park boundary. This area has more contrast in terms of topography than the rest of the park. Various interesting natural features occur in this zone; these include: forest stands of maple-beech hardwoods, eroded creek channels, and vistas and land formations such as the ancient, raised beach ridges. Since the zone is fairly isolated due to its location west of the County road, the possibility of interaction with recreational programs carried out in intensive use areas is substantially reduced. Its location may protect it from encroachment and overuse, and allow it to remain the most outstanding natural area in the park for interpretation, outdoor education and limited extensive recreation activities.

The major function of this zone is to provide an ideal setting for nature study and interpretation. A secondary role is to provide an area for demonstration of resource management. Management programs will be designed to retain the natural character of the west half of the zone and the traditional agricultural landscape of the east half to complement wildlife management programs such as waterfowl.

The zone has two distinct sections: open, cultivated fields in the eastern portion, and wooded hills and plateau in the western portion. Recreational facilities in the natural environment zone will be limited to access, parking and trails.

Outdoor Recreation Management

Hiking, rambling and exploring, viewing, cross-country skiing, snowshoeing, interpretation, outdoor education and resource management demonstration programs will be permitted in this zone. Controls for this zone will be in accordance with the general park policy guidelines.

Resource and Land Management

To retain the natural character of the zone, resource management programs for vegetation and wildlife will be carried out according to the guidelines set down in the general park policy.

Figure 10

Zoning

-  Development Zone
-  Natural Environment Zones
-  Proposed Park Boundary

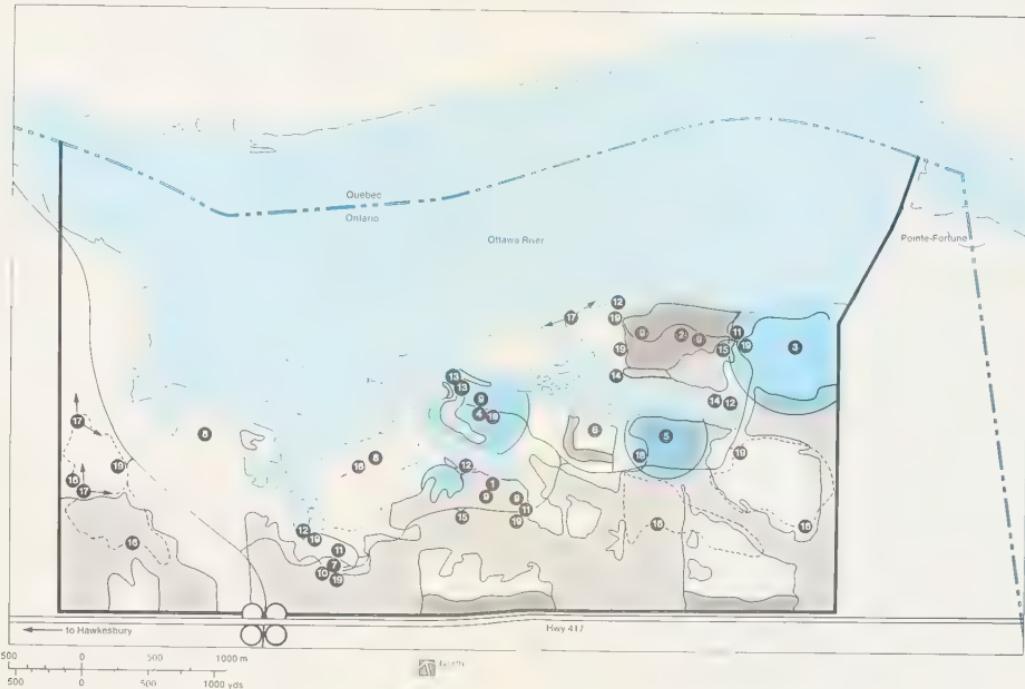


Figure 11

Master Plan

1 Campground 1	10 Administration Buildings
2 Campground 2	11 Control Office
3 Campground 3	12 Boat Launch
4 Day-Use Area	13 Picnic Shelter
5 Visitor Services Area	14 Fishing Dock
6 Group Campground	15 Firewood
7 Administration Area	16 Trail
8 Wildlife Management Areas	17 Vista
9 Comfort Station	18 Amphitheatre
	19 Parking

Beach
 Forest Cover
 Reforestation
 Future Development Areas
 Proposed Park Boundary



Park Management and Operation

Park Staff

The estimates and proposals concerning park staff requirements are indicated in Table 13. Also, the organization of the staff is shown in Figure 12.

Water Supply

Within the park, the potable water supply is provided from drilled wells. The water is chlorinated and tested on a regular basis to ensure public safety. Water for the sewage system is also provided from other drilled wells.

Sanitary Facilities

Washrooms will be provided in the developed day-use areas and campgrounds. Depending on the location, vault privies or washrooms will be provided. Because of tile bed problems, sewage will be handled by two lagoon installations. The first of these will be functional in 1977. In subsequent phases of development, shower facilities will be installed. An ample supply of waste containers will be provided in the developed day-use areas, campgrounds and at other locations throughout the park. These will be emptied on a regular basis by maintenance staff.

Electricity

The required electrical services for the park will be obtained from the supply in the surrounding area. Electrical outlets are provided within the campgrounds, with the service underground where feasible.

Telephone Service

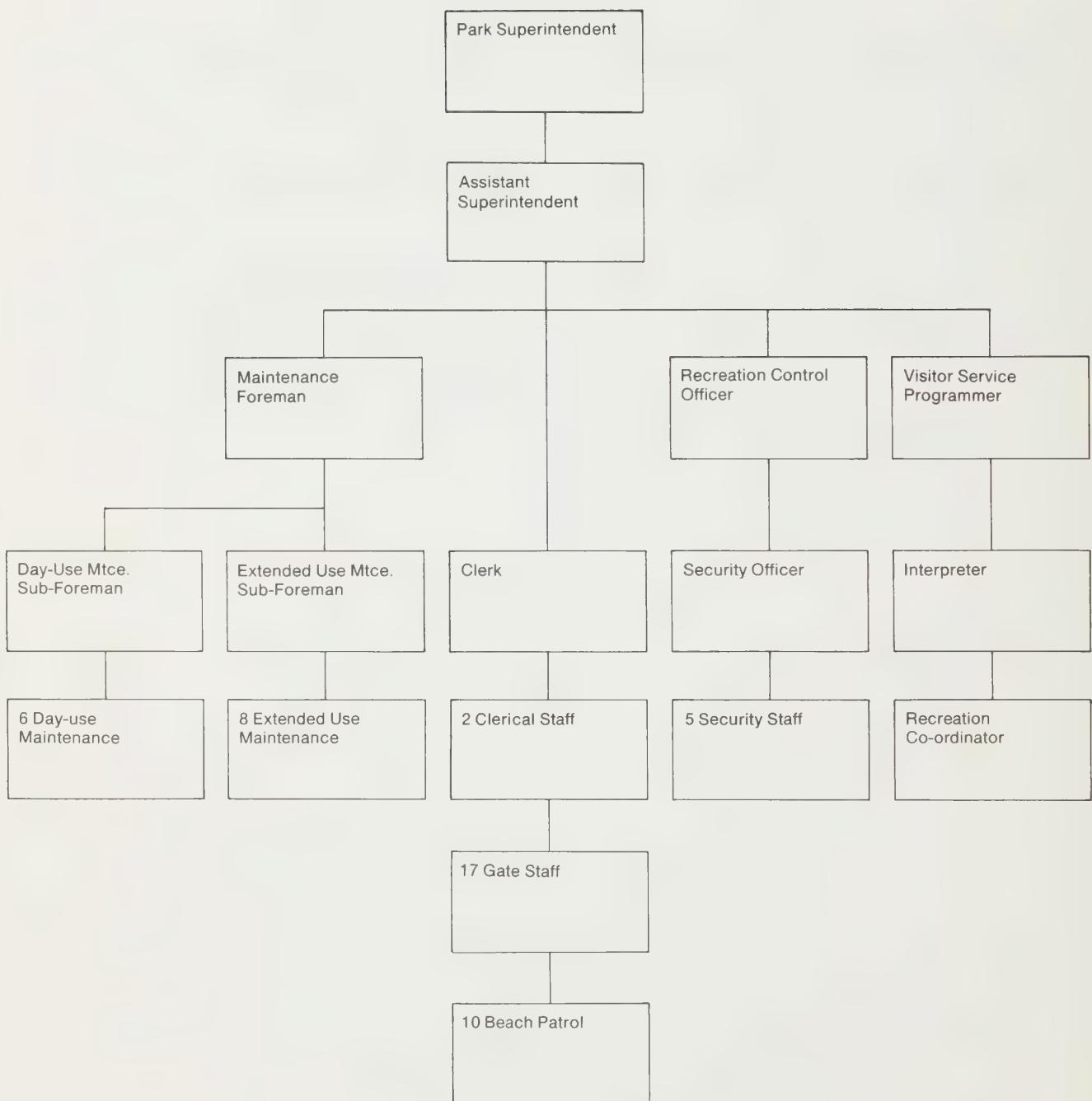
A public telephone is provided near the entrance to the park. For administrative purposes within the park, an intercom system has been installed.

Emergency Services

All reasonable precautions will be taken to ensure the safety of park visitors. A comprehensive Emergency Services Plan has been developed including a communications network, first aid, fire protection, as well as police and ambulance service to the park. Portable fire fighting equipment such as pumps, hoses and hand tools are provided within the park. Park staff are thoroughly trained in fire prevention and fire fighting procedures.

Table 13: Proposed Staff Requirements

	Present	Phase 1	Phase 2	Phase 3	Total
<i>Permanent</i>					
Superintendent	1				1
Assistant Superintendent		1			1
Maintenance Foreman		1			1
Visitor Services Programmer		1			1
Recreation Control Officer		1			1
Clerk		1			1
Security Officer	1				1
Total	2	5			7
<i>Casual</i>					
Clerical	1		1		2
Gate staff	7	5	3	2	17
Security	1	2	2		5
Maintenance	6	6	4		16
Beach patrol	2	4	2		8
Visitor services		2			2
Maintenance sub-foreman	1	2			3
Total	18	21	12	2	53

Staff Organization

Plan Implementation

Phasing of Development

The park development proposed in this plan will be completed over a five-year period in three phases. Since location and access factors place Carillon in a position of high demand for accommodation facilities, Phase One will emphasize the expansion of camping facilities and land acquisition, combined with an appropriate increase in staffing and equipment. The initial stages of the waterfowl management program will also be carried out during this phase.

Phase Two will extend over two years and will focus on day-use and interpretive facilities and additional staff and equipment to operate the park program. It is anticipated that the trends in recreation interests, education and population growth will bring increased day-use pressures upon the park.

Phase Three will be the final year of the development program. During this phase, resource management programs will be stressed. Additional staff and equipment will be required to effectively manage and operate the park.

Management Plans

Implementation of the master plan will require the development and implementation of management plans. These will include:

Outdoor Recreation

Site Design and Development Plans
Visitor Services, Plan and Program

Resource

Forestry
Fish and Wildlife
Land and Soil
Water
Minerals

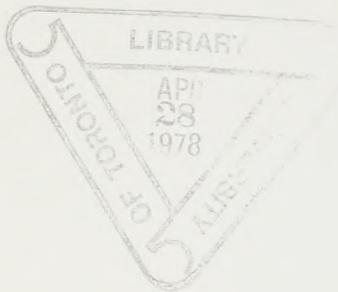
Ongoing Studies

Archaeology
Resource Management
Historical Architecture
History

Monitoring

Changing circumstances, evolving public needs, park use and environmental impact will be considered at five-year intervals during detailed reviews of the master plan. A monitoring process will be designed which will provide Ministry staff with a continuous flow of relevant information about park usage, level of public acceptance and environmental impact in order that appropriate adjustments can be made to the park operation and management.

References



Ministry of Natural Resources Publications are available at the Eastern Region office, Kemptville, Ontario.

Burton, T. and Purych, P. *An Environmental Inventory of Carillon Provincial Park*. Toronto: Ministry of Natural Resources, 1970.

Canada Department of Agriculture, and Ontario Department of Agriculture. *Soil Survey of Russell and Prescott Counties*. Guelph, 1962.

Canada Department of Environment. *Temperature and Precipitation*. 1941-1970. Ottawa, 1970.

Canada Department of Indian Affairs and Northern Development, Parks Canada. *Canadian Outdoor Recreation Study, Technical Note*. 22. Ottawa, 1973.

Canada Department of Public Works. *Report on the Georgian Bay Ship Canal*. Ottawa, 1908.

Chapman, L.J. and Putnam, O.F. *The Physiography of Southern Ontario*, 2nd ed. Toronto: University of Toronto Press, 1966.

Heisler, J.P., "The Canals of Canada," *Occasional Papers in History and Archaeology*, No. 8. Ottawa: Parks Canada, Department of Indian Affairs and Northern Development, 1972.

Higginson, M.A. and Brock, J.T. *The Village of Hawkesbury, 1808-1888*. Hawkesbury, 1961.

Hills, G.A. *A Ready Reference to the Description of the Land of Ontario and its Productivity* (Preliminary report). Toronto: Ontario Department of Lands and Forests, 1959.

Legget, R.E. *The Ottawa Waterway*. Toronto: University of Toronto Press, 1975.

McKenzie, R. "The John MacDonell House, 'Poplar Villa', Pointe-Fortune, Ontario" (unpublished report).

Ontario Provincial Parks Statistical Reports, 1972-1974. Toronto: Ministry of Natural Resources, 1974.

Sensitive and Special Areas Report. Kemptville: Ministry of Natural Resources, 1972.

Tourism and Outdoor Recreation Planning Study. Toronto: Ministry of Natural Resources, 1975.

Stokes, P.J. *Architectural Report on "Poplar Villa": The MacDonnel House, Pointe-Fortune, Ontario*. 1969.

Thomas, A.E. *History of Argenteuil and Prescott*. Montreal, 1896.

Wilson, A.E. *Geology of the Ottawa-St. Lawrence Lowlands, Ontario and Quebec*. G.S.C. Memoir, No. 41. Ottawa, 1964.



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